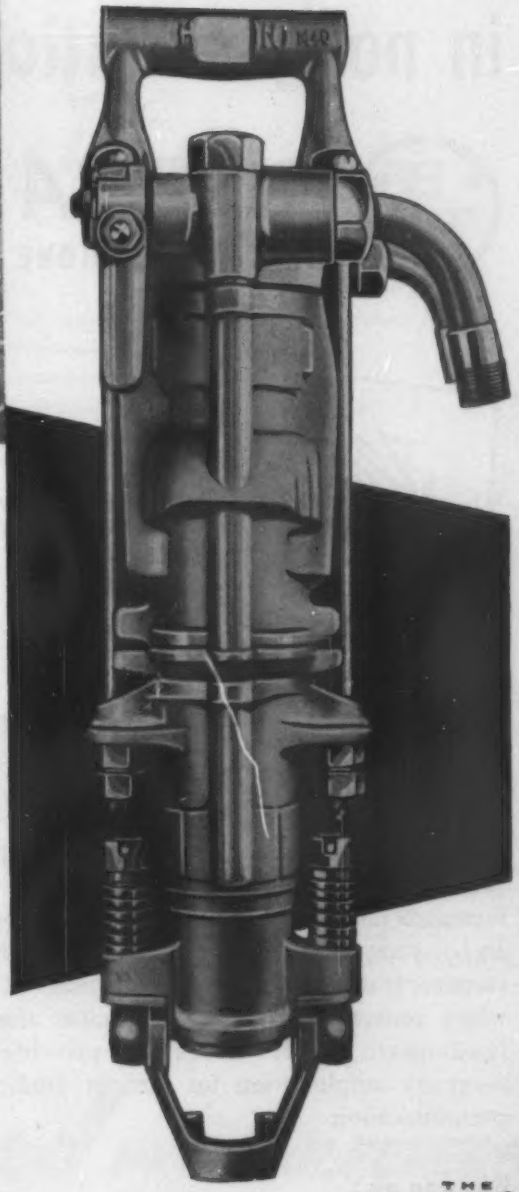
The Mining Journal

LONDON, OCTOBER 24, 1958

Vol. 251. No. 6427. Price Ninepence



Tested and proved the Holman Silver Three

The famous Silver Three has proved its efficiency all over the world on every type of rock. It takes the toughest work in its stride, cuts drastically the real cost of a drill—*running cost*.

Every Silver Three is thoroughly tested—your guarantee of a drill that will tackle the toughest rock for years and years. Like all Holman products, the Silver Three 'pays with its life'.

Holman
PNEUMATIC EQUIPMENT

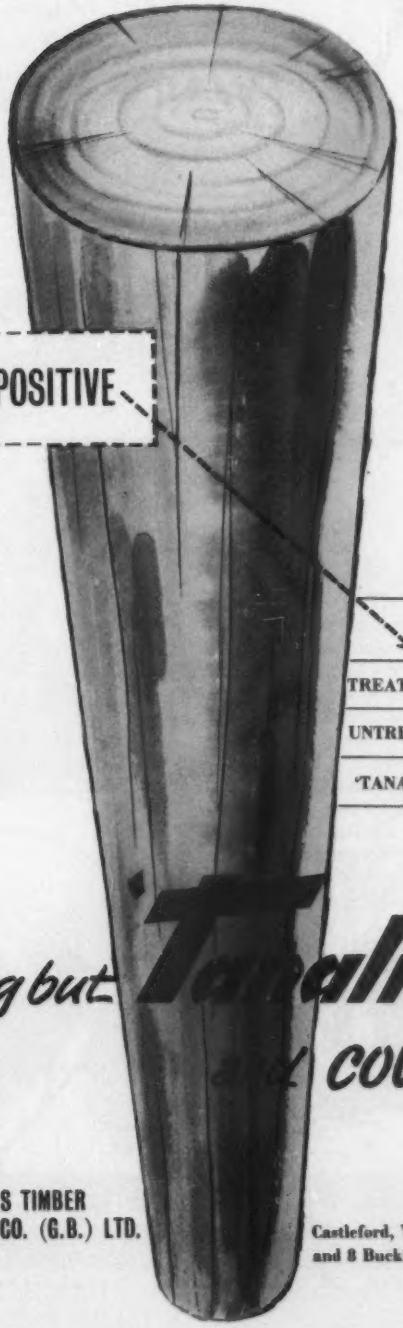
PAYS . . . WITH ITS LIFE

THE HOLMAN GROUP

HOLMAN BROS. LIMITED, CAMBORNE, ENGLAND
A company in the Holman Group which has branches, technical representatives and agents throughout the United Kingdom and the world.
Telephone: Camborne 2275 (10 lines). Telegrams: Airdrill, Telex, Camborne. London Office: 44 Brook Street, W.1. Telephone: HYDe Park 9444

HK1

Taking the Strain



PROOF POSITIVE

Roof supports of 'Tanalised' timber take the strain year in year out. Their strength is a constant, unaffected by the decay hazards of their environment. The NCB test results reproduced below show the strength of individual props extracted from a roadway. All the props are sound and the variation above and below the average is a normal variation between ungraded props. (Both the props and the treatment were taken from a normal commercial supply). The test is to continue for 40 years—far beyond the life expectancy of most mine equipment.

	COMPRESSION TEST									
TREATMENT	1	2	3	4	5	6	7	8	9	Years
UNTREATED	18.0	8.3	–	PROPS REMOVED				–	–	Tons
'TANALITH'	28.5	32.5	26.35	33.4	24.7	28.0	24.5	27.3	38.05	Tons

nothing but 'Tanalised' PROPS, SLEEPERS and COVER BOARDS will do!

HICKSON'S TIMBER IMPREGNATION CO. (G.B.) LTD.

Castleford, Yorkshire. Tel. Castleford 2607.
and 8 Buckingham Palace Gardens, London, S.W.1. Tel. Sloane 0636.

The Mining Journal

London, October 24, 1958

In this issue . . .

Vol. 251 **No. 6427**

Established 1835

Editor
U. Baliol Scott

Deputy Editor
A. Graham Thomson

Assistant Editor
R. Bowran

Assistant Financial Editor
R. A. Nuttall

Display Advertisement Manager
E. S. Hooper

Circulation
Robert Budd

Published each Friday by

THE MINING JOURNAL LTD.

Directors
E. Baliol Scott (*Chairman*)
U. Baliol Scott (*Managing*)
G. A. Baliol Scott
R. A. Ellefsen

15 WILSON STREET, LONDON, E.C.2

Telegraphic Tutwork London
Telephone MONarch 2567 (3 lines)

Annual Subscription £3 **Single copy ninepence**

Eire Shows the Way

IT is tempting, but perhaps not altogether justifiable, to draw a sharp contrast between the revival of Eire's non-ferrous mining industry, as exemplified last week by the official opening of St. Patrick's Mines at Avoca (see page 446), with the continued stagnation of metal mining in the United Kingdom.

In one respect, conditions are broadly similar in the two countries, inasmuch as each has a metal mining industry which was once flourishing but has long ceased to be prosperous. Generally speaking, the decline of non-ferrous production in both countries does not appear to have come about through exhaustion of the deposits being exploited, but originated as a result of competition from other continents where ores could be worked more cheaply, and was accelerated by the slump in base metal prices towards the end of the nineteenth century. In the light of present-day knowledge, it also seems clear that the scope for exploration and the depth at which orebodies could be mined were limited not only by metal prices but also by the equipment and techniques formerly available.

In the United Kingdom there have been many half-hearted attempts to resuscitate what is one of our oldest industries. Their failure has given rise to considerable scepticism on the part of both government officials and private enterprise, and successive British Governments have turned an uncompromisingly deaf ear to the suggestion that an industry of such negligible fiscal significance as mining is today should be accorded special tax concessions.

Very different has been the attitude of the Irish Government, but in this connection it will be appreciated that to Eire, with its critical dependence on an agricultural economy, the benefits to be gained from the revival of the mining industry were particularly attractive. Whatever the incentive, however, there can be nothing but admiration both for the perspicacity shown by Eire in recognizing the potentialities of its neglected mineral resources and for the realistic manner in which the task of evaluating mineralized zones in terms of proved reserves and enlisting overseas financial and technical resources in their development has been accomplished by the State.

As far back as 1947, Mianrai Teoranta, the government-sponsored mineral company, was set up to undertake initial explorations in the light of modern mining methods, machinery, and metallurgical techniques. It resumed exploration and development work at Slieveardagh and began exploration work on the copper deposits at Avoca. By that time the idea that Eire had not got mineral resources was beginning to fade. Even so, few people could have had the temerity to visualize that Mianrai Teoranta would prove the existence of 15,000,000 tons of ore of economic value at Avoca —one of the largest deposits in Europe.

Among the foremost requirements for a vigorous and thriving mining industry is the establishment of a favourable financial climate. This was clearly realized by the last Inter-Party Government, which introduced mine taxation in 1955, whereby profits to resident Irish companies from new mining operations for certain minerals are exempt from tax for the first four years and are liable

to only one-half tax for the next four years. The tax concessions also include allowances which may be claimed against the profits of a mine in respect of capital expenditure on development of the mine, on search for or testing deposits or winning access thereto, or on the construction of new works. The requirements for Irish control of the firm may be waived by special licence. There is also provision for importation of mining machinery free of tariffs.

In addition to granting tax concessions, the State has shown its readiness to assist mining companies by loan guarantees. Attention has also been given to the question of mineral rights, which is complicated in Eire (as in Britain) by the existence of ancient land acts. Some 70 per cent of mineral rights are currently owned by the State, the balance being under private ownership. To overcome complications which might arise in the assigning of mineral rights, the government has the power to exercise compulsory acquisition at a fair value.

Mention should also be made of the Geological Survey of Ireland, whose keen interest in promoting the development of the country's resources of economic minerals merits special comment. Its ready co-operation with private enterprise has been a major factor in the revival of Irish mining.

The policy of encouraging and assisting foreign investment is beginning to yield rich dividends. So far, some £1,800,000 has been invested by a Canadian public company in the Avoca undertaking, which is currently giving direct employment to about 500 people. Of the principal executives of St. Patrick's Mines Ltd. three are Canadian engineers and the balance Irish. At a dinner in Dublin, Mr. C. P. McTague, chairman of St. Patrick's, expressed the hope that before very long the executive and administrative management of the mine would be taken over by the Irish with no assistance from Canada.

St. Patrick's Mines, if the most spectacular achievement, is by no means the only mining proposition with which overseas interests have become associated. At Allihies, County Cork, the Irish subsidiary of a Canadian company hopes to prove 1,000,000 tons of good grade copper ore associated with the ore shoot under examination. Considerable interest has also been shown in lead, production of which has been exceeding 2,000 tons a year (metal in concentrates) with a rather smaller quantity of zinc. A number of prospecting operations ceased last year, the announcements usually stating that work had been "suspended pending study of results". The prospecting licences were not relinquished, however, and it may be anticipated that the restoration of confidence in the outlook for non-ferrous metals would soon be reflected in the resumption of operations at most of the prospects in question.

Meanwhile, the happy alliance of State and commercial interests—the latter predominantly Canadian—has shown that beneath the top dressing of stardust which—the song tells us—was applied by the angels to make the shamrock grow, Eire has been liberally sprinkled with non-ferrous metals. In the words of Mr. H. W. Knight, jun., president of Consolidated Mogul Mines, Ltd., and a director of St. Patrick's, there are many more mines to be found.

From the statements made by members of the present and former governments during the opening ceremony at Avoca and at the dinner in Dublin, it is clear that commercial interests in any country prepared to contribute capital or special knowledge to the exploitation of Eire's mineral resources can count on the utmost goodwill and co-operation from all parties in the Dail.

Seldom does exploration uncover deposits large enough to warrant opening up on the St. Patrick's scale. Nevertheless, the United Kingdom Government can scarcely fail to be impressed by the success of the Irish-Canadian undertaking. It remains to be seen whether the evidence put forward at the Symposium held in London last month is regarded as sufficiently favourable to justify a further attempt to convince Whitehall that our own domestic mineral resources are promising enough to merit systematic investigation by the efficient but very costly techniques available at the present day.

ECONOMIC UTILIZATION OF U.S. MANGANESE

At the present time, the United States constitutes the largest market for manganese in the world. The exploitation of its own extensive resources of low-grade manganese, if it could be economically achieved, would thus have a dramatic impact on the manganese trade. This situation lends particular interest to the research programme on manganese, which is to be undertaken by the Bureau of Mines during the fiscal year beginning July 1, 1958. Throughout the period, the Bureau will investigate and appraise domestic manganese deposits, and also will conduct basic research in mining and metallurgy, assist various Federal agencies concerned with manganese supply and development, and collect and publish statistical and economic information relating to manganese.

The research activities will be conducted in widely scattered centres, and will include many and varied facets of the overall programme. At Albany, Bureau metallurgists will carry out continuous circuit tests on composite samples representative of the manganese oxide ores purchased by the General Services Administration under its Butte-Philipsburg purchasing programme, a pre-requisite to any future pilot plant tests or other work with these ores. At Spokane, work on a catalogue of manganese deposits of the north-western area will continue. Meanwhile, the production of high-quality synthetic manganese dioxide by chemical means is being investigated at Reno, and at Boulder City fundamental studies are developing basic information on pyrometallurgical reduction of manganese from manganese minerals.

A reconnaissance survey has been made of rhodonite deposits in the San Juan region of Colorado and laboratory research is proceeding with the samples obtained. Magnetic concentration has shown some promise, and may lead towards the possible utilization of this hitherto unacceptable material. During the research period, additional work to be carried out at the Bureau's research station at Salt Lake City will seek improvements in an oil emulsion flotation process for manganese ores, improved recovery of manganese sulphate from leach solutions and its subsequent decomposition so that sulphur dioxide leaching of manganese oxide ores can be cyclic and economic, and an economic evaluation of metallurgical processes best suited for recovering manganese from the so-called hard or enriched ore of Arizona's Artillery Mountains.

At Denver, the Bureau will continue its experimental application of advanced statistical analyses to determine the average grade and tonnage of orebodies and the minimum number of samples required. Manganese deposits in New Mexico are being examined at the present time, and samples of ores obtained in these examinations are being investigated at the Tucson station, where major efforts are being made to improve oil emulsion flotation and the percolation leach process.

The investigation and cataloguing of deposits in Arkansas is being extended throughout the State, the work already having established a large reserve of manganiferous limestone averaging approximately 5 per cent manganese. Metallurgical research at Rolla, Montana, has obtained ferrograde concentrates from this material and efforts will now be made to improve the recoveries. Ore dressing studies will continue on the other manganiferous

materials of Arkansas, and recovery of manganese from mill slimes will be examined on a laboratory scale. These slimes represent a large proportion of the milling losses for many manganese ores, and because of this the Rolla experiments are of particular interest.

In Minneapolis, the Bureau is to conduct research on the beneficiation of various Cuyuna range materials. These materials represent one of the larger domestic manganese resources of the United States. Other Bureau research centres throughout the country will conduct similar research programmes.

It is as well, however, to emphasize that in any reassessment of the sub-economic manganese resources of the United States, mining and recovery costs are clearly as important as technical feasibility. It will be of little help to the United States if its economy be saddled with a number of high cost and essentially marginal operations dedicated to the production of manganese, absorbing labour and capital that could profitably be employed in more efficient fields, while manganese is so readily available in other parts of the world.

PROGRESS OF THE B.S.I.

The annual report of the British Standards Institution for 1957-58 reveals another year of progress, two outstanding trends being the enlarged scope and importance of international collaboration on standards and growing public recognition of the institution's work. One of the most pleasing items reported was a record increase in the number of new subscribing members, which rose from 9,000 to nearly 10,000 during the year.

In regard to flameproof lighting fittings, the report notes that, as a result of experiments on prototypes as the basis of a standard for plastics tube lighting fittings, a satisfactory cement has been found for bonding the plastics tube to metal end-rings, but the difficulty of determining the best technique of bonding, to provide assured results on large-scale production, and to meet the air (or water) pressure test requirements of the Ministry of Power, remains unsolved. It is being investigated in collaboration with the Electrical Research Association.

The revision of B.S. 413 "Steel tub wheels and axles" has been completed, incorporating the requirements of the N.C.B. Specification P.116 for fixed wheels, and adding a non-precision parallel roller bearing design to the present B.S. 413 specification for loose wheels. The number of sizes of fixed wheels, already substantially reduced to 47 by the N.C.B. specification, has been further restricted by agreement with the makers and N.C.B. members of the committee. The committee's scope has been extended to deal with other components of pit tubs, which will form Section Two of the standard, and components of draw-gear are now being considered.

The quality of steel used in high-tensile steel chains (round-links) for chain conveyors and coal ploughs must be assured, since the chains must be capable of withstanding a heavy load without suffering permanent deformation, while at the same time possessing sufficient shock absorption capacity to exclude the possibility of brittle failure. These qualities are ensured in a new standard, B.S. 2969, by exacting test requirements as distinct from a detailed material specification. The nominal sizes of chain are expressed in metric units with inch equivalents, and there will be interchangeability between British and Continental chains of similar pattern.

Forty countries are now members of ISO (International Organization for Standardization), which has set up a number of new technical committees.

Eleven countries, including the U.K., were represented at a meeting of the technical committee on manganese ore in Moscow in November, 1957 (Secretariat : U.S.S.R.). The committee continued consideration of methods of analysis and six further methods were agreed for the determination of barium oxide, combined water, zinc (gravimetric method), vanadium (volumetric and photocolorimetric methods), titanium and calcium oxide and magnesium oxide. At the next meeting it is hoped to complete work on chemical analysis; methods for the determination of zinc by a polarographic method, metallic iron and chromium being considered. Consideration of sampling is to be continued.

The report states that the first meeting of the technical committee on mining (Secretariat : Germany) was again postponed, due to preparatory work in the various countries being insufficiently advanced. The secretariat has issued detailed proposals for the standardization of signs and symbols used on mining plans and geological surveys to denote principal rock formations.

ANOTHER CANADIAN MINING GIANT

Contractors are now engaged in clearing the right-of-way for a railway 193 miles long, which is being built from the St. Lawrence River northwards to the huge iron ore deposits of Quebec Cartier Mining Co. at Lac Jeannine in the hinterland of Northern Quebec. Work is expected to proceed right through the winter, completion of the job being scheduled for the late autumn of 1960.

Described by *The Northern Miner* as "another giant rising on the Canadian mining scene", Quebec Cartier will be not only the costliest Canadian mining project—expenditure for the entire project is expected to reach $300,000,000—but also the biggest. The eventual mining rate calls for the treatment of over 60,000 tons of open pit ore per day for an annual output of 8,000,000 tons of iron pellets. This will involve the removal of some 20,000,000 tons of crude run-of-pit ore each year.

Quebec Cartier—formerly the Cartier Mining Co.—was incorporated for the purpose of exploring and developing low-grade iron deposits in the southern extension of the Quebec-Labrador iron formation in Saguenay County, an area generally referred to as Mount Reed-Mount Wright, which is located about 200 miles north of Shelter Bay.

Besides the construction of a railway for the haulage of iron ore to the St. Lawrence River, the company's programme calls for the development of about 60,000 h.p. on the Hart-Jaune River, located about 15 miles south of Lac Jeannine. To assure an adequate supply of power, a bill authorizing the Hart-Jaune Power Co. to lease power rights on the Hart-Jaune River, which has a potential of 175,000 h.p., was passed by the Quebec Government early in 1957.

In order to provide access to the mine area for development and engineering work, approximately 160 miles of truck road were constructed last year. The remaining 40 miles to Lac Jeannine were scheduled for completion early in the current year. Two air strips have been constructed to permit air transportation to the mine area. The project also involves the construction of a new deep-draught harbour and loading facilities near Shelter Bay.

These installations will require the founding of two new modern towns to accommodate a combined population of about 5,000 people, and will give direct employment all the year round to at least 1,500 people.

This vast enterprise, which will be financed in its entirety by the parent company, U.S. Steel Corp., is expected to add over $100,000,000 to the value of Canada's mineral production. In so doing, it will open the gate to what our contemporary terms a whole new iron ore province in Northern Quebec.

NUCLEAR RAW MATERIALS—I.

World Uranium Resources

IN 1955 when the First International "Atoms for Peace" Conference was held in Geneva the non-Communist world produced 11,500 tons U_3O_8. This year, in which the Second International Conference has just been held, uranium production is expected to exceed 35,000 tons U_3O_8 and increases in plant capacity already planned should raise this total to 42,000 tons in 1959.

This year the U.S.A. is expected to produce uranium concentrates containing 15,000 tons U_3O_8, a production increase of over 6,000 tons in one year, whilst Canadian output should rise to 13,000 tons U_3O_8 from last year's total of 6,687 tons. The South African uranium production programme after its rapid establishment has displayed a slower growth rate and output has been stabilized at about the 6,000 tons U_3O_8 level.

The balance will come from Australia (about 1,000 tons U_3O_8 with Mary Kathleen in production), the Belgian Congo, France with a target output of 550 tons, Portugal, Italy, N. Rhodesia and other smaller producing countries.

France expects to raise production to 1,500 tons U_3O_8 by 1962 and other nations will presumably follow her lead in establishing domestic uranium industries wherever possible, but the overall growth of uranium mining will depend on the expanded markets for uranium anticipated about 1965. The three main producers can easily expand their output in the face of this expected demand and this is particularly true of South Africa where potential uranium producers have been restrained by the quota purchasing policy of the Combined Development Agency.

Since 1955 the developed uranium resources of the non-Communist world have been increased by a million tons to total 1,500,000 tons U_3O_8. Developed or partially developed reserves in Canada and South Africa indicate that each of these countries has reserves containing 400,000 tons U_3O_8. In the U.S. reserves are now about 220,000 tons whilst France has 50,000 to 100,000 tons. Ultimate production from these and other Western countries may eventually reach 2,000,000 tons and on the basis of present geologic data and the discovery experience of the last 10 years, an additional 2,000,000 tons should be developed in new areas with aggressive exploration programmes.

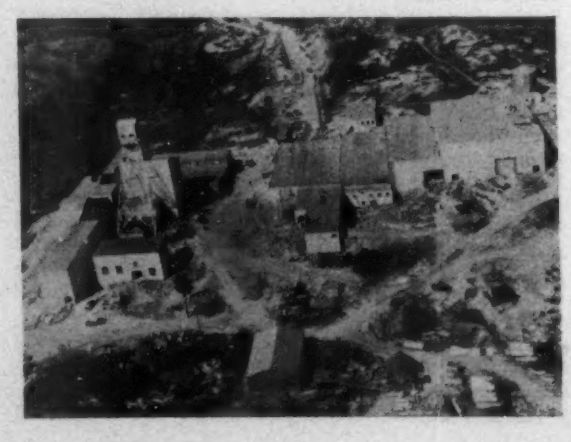
The article appearing herewith, the first of a series devoted to the nuclear raw materials, summarizes the situation appertaining to uranium production as it applies to certain of the more established producing countries.

The easing of security restrictions has made it difficult for the main producing nations to add greatly to the information already available before the Geneva Conference began. On the other hand, those nations still maintaining secrecy about uranium reserves and production have maintained almost total silence so that the world uranium picture is still incomplete. This has made it difficult for some nations to plan a uranium production programme whilst atomic power engineers were still unable in 1958, as in 1955, to predict what the future demand for uranium might be. A demand in excess of potential production capacity and a consequent rise in the price of uranium oxide is difficult to visualise when examining the information on uranium deposits in those countries presenting papers at Geneva. A selection of these papers is reviewed below.

France and Canada

In 1945 when the French Atomic Energy Commission was created not a single uranium deposit was known in France or in the French Union. In 1948 an intensive exploration effort was rewarded by the discovery of rich vein deposits of pitchblende in the Henriette Mine at La Crouzille. Today seven main deposits of the hydrothermal lode type are being exploited in the Limousin, Forez and Vendee regions. The most important French deposit is that at Bois Noirs in the Forez region where the reserves developed to a depth of 200 metres contain at least 4,000 tons of uranium. The uranium occurs with pyrite and galena in a lode 1 metre to 3 metres in width and with a strike length approaching 800 metres. The French mines are grouped around 4 mills situated or to be constructed at Ecarpiere, Bessines, Bois Noirs and Guegnon. The first of these with an original capacity to treat 150,000 tons of ore annually commenced operation in January 1957 and has been doubled in capacity early this year by the addition of a second unit. The Ecarpiere mill is situated on the mine of the same name in the Vendee and is to treat ore from the neighbouring Chapelle Largeau and Commanderie deposits.

The Bessines mill commenced treating ores from the Limousin region in January and next year throughput will be tripled (to 600,000 t.p.a.). The Bois Noirs mill is scheduled to be in operation at the end of 1959 treating 180,000 t.p.a.



Alongside, at right, the uranium plant at Bessines-sur-Gartempe, France.

In the centre of the column, below, is shown the Monarch Shaft headgear and winder house at West Rand Consolidated, the first shaft in South Africa to be planned solely for uranium ore mining operations.

At left, below, on opposite page, Pronto Uranium Mines Ltd., in the Blind River area of Canada.

Guegnon has been in operation since 1954 and was converted in 1955/6 to treat high grade ores from various French mines. Output is at the rate of 200 tons U_3O_8 per annum using a process based on the direct precipitation of uranate of lime from the leach liquors. The other mills use standard extraction methods of sulphuric acid leaching, ion exchange extraction and precipitation of magnesium uranate.

At the end of 1957 fifteen mines having their own treatment plants were in operation in Canada and plants at four other mines were nearing completion. Six smaller mines were shipping ore to some of the operating plants. Production in 1957 was estimated to total 6,687 tons U_3O_8 valued at $136,700,000.

From 1933 to 1953 Canadian uranium production was derived from the high-grade pitchblende-bearing veins of the Eldorado Mine at Great Bear Lake which is still producing. In 1953 operations commenced on the more accessible deposits of the Beaverlodge district which are of moderate grade (averaging 0.2% U_3O_8). The first of the Blind River mines was brought into production in 1955 and the output from the low grade (0.1% U_3O_8) conglomeratic deposits surpassed that from pitchblende deposits for the first time in 1957. Since 1956 three properties mining low grade pegmatitic deposits have also been brought into production.

The rated production of plants operating in the Blind River area totals 26,500 tons per day and the total will be raised to about 35,000 tons per day by the end of this year. The estimated reserves of the Blind River field are 355,700,000 tons of ore carrying approximately 0.1% U_3O_8. Over 31,000,000 tons of this ore is proven ore.

The United States and South Africa

At the end of 1954 American reserves of uranium were estimated to be 10,000,000 tons of ore containing 30,000 tons U_3O_8. Today they are estimated to be 80,000,000 tons of ore containing about 220,000 tons U_3O_8. These ore reserves are in the economic category embracing deposits that can be profitably worked with a price of $10 per lb. U_3O_8 or less.

At present 26 plants are operating or under construction in the U.S.A. including 3 for recovering uranium from phosphate rock. Two phosphate plants have achieved costs in the range of $7 to $12 per lb. U_3O_8 produced as a by-product of the phosphate chemical and fertiliser industry. Production is at present small but could eventually grow to several thousand tons a year. World reserves of more than 20,000,000 tons of uranium in low grade bituminous shale and phosphate deposits carrying from 1/10 to 1/5 lb. U_3O_8 per ton are estimated to exist and the U.S.A. has 5 or 6 million tons of uranium in the uraniferous portion of the Chattanooga shale. (Similar shales in Sweden and the Russian Baltic area have a considerably higher uranium content than that at Chattanooga.) A U.S.A.E.C. research programme has indicated a uranium cost of $40 to $50 per lb. if this shale were mined and processed for uranium alone. Process improvements and operating experience might reduce this figure but major cost reduction depends on the economic recovery of various by-products such as bituminous materials, alumina and iron.

According to recent estimates of South African uranium resources there are over 1,100,000,000 tons of indicated ore in the Union's mines with a uranium oxide content of the order of 370,000 tons. Other known occurrences, mostly in pegmatite, are unimportant from the point of view of uranium production. A Geneva paper describing the Witwatersrand banket deposits states that gold, uraninite and pyrite mineralisation does not extend beyond the limits of a conglomerate bed and across the stratification into adjacent rocks. Careful and systematic sampling has shown that fractures, dykes, quartz and occasional calcite veins bear no relation to the distribution of gold and uraninite values except for local enrichment or impoverishment of values.

Whilst stating that the origin of both gold and uraninite is in dispute, the paper leans strongly towards the syngenetic theory of origin of the Witwatersrand deposits.

Present production at the rate of some 6,200 tons uranium oxide per annum is expected to rise to 6,400 tons by the end of 1959.

STEEP ROCK'S HOGARTH SHAFT

AT Steep Rock Lake, Ontario, one of the largest single opening mines in N. America is being developed. A production schedule aimed at a capacity of 1,000 l.tons per hour is planned for this mine, which is located 70 miles due north of Ely, Minnesota. The shaft is described by G. B. Hamilton, Hogarth Mine Engineer, Steep Rock Iron Mines Ltd., in the *Mining Congress Journal.*

A branch line of the Canadian National Railway passes through Atikokan, a town six miles south of the mine, and high-grade ore is brought over a spur line from the mine to the town, and from there 140 miles east to Fort William and Port Arthur. It is then transported in lake freighters destined for the lower lake ports.

Steep Rock Iron Mines Ltd., was formed as a company in the 1930's, although float ore had been found on the shores of Steep Rock Lake as early as the turn of the century. Working on the ice during the winter months, diamond drills investigated the lake bottom and indicated ore occurrences. Due to its nearness to Atikokan and also because of its high elevation in comparison with other ore bodies, the "B"-zone, or Errington mine was developed first.

Underground Mining

When the Hogarth open pit, now producing more than 2,500,000 tons a year, reaches its economic limits in 1960, the operation will have to switch to underground mining. Long-term plans call for an ultimate sustained tonnage of 5,500,000. The "G" zone, to which the open pit will move, lies below the "A" and "B" zones, and due to its narrower width the scheduled production will be only 1,500,000 tons annually. The Hogarth underground supplies the need of an underground unit capable of producing 2,500,000 tons, a capacity necessary to meet long-term expansion. While preliminary design of the Hogarth underground was being made, it was decided that the plant should be designed for 20,000 t.p.d. hoisting capacity, or 1,000 l.tons per hour. Location thus became more important, and, although all the development to date had been from the hanging wall side, it was decided that the new mine would be shifted over to the footwall. The method of bringing 1,000 t.p.h. to the surface was given much careful thought. In the Errington mine a 4,200-ft. underground conveyor transported the ore from the underground crusher to the loading bins.

Four pumps of 1,000 g.p.m. capacity handle water disposal at Errington No. 1 Mine, Steep Rock, Ontario

This system was working satisfactorily and served a dual purpose, as both a hoisting and a haulage agent. At the Hogarth mine conditions were different. The elevation between the first production level and surface was greater, and the shaft was to be collared closer to the ore contact. After examining the advantages and the disadvantages of the conveyor system at Errington, it was finally decided to go back to skip hoisting at Hogarth, with a hoisting plant designed for an ultimate depth of 2,000 ft. A skip would be required for 20 l.tons or 22 s.tons capacity, and the design of a hoisting plant capable of handling skips of this size presented a problem.

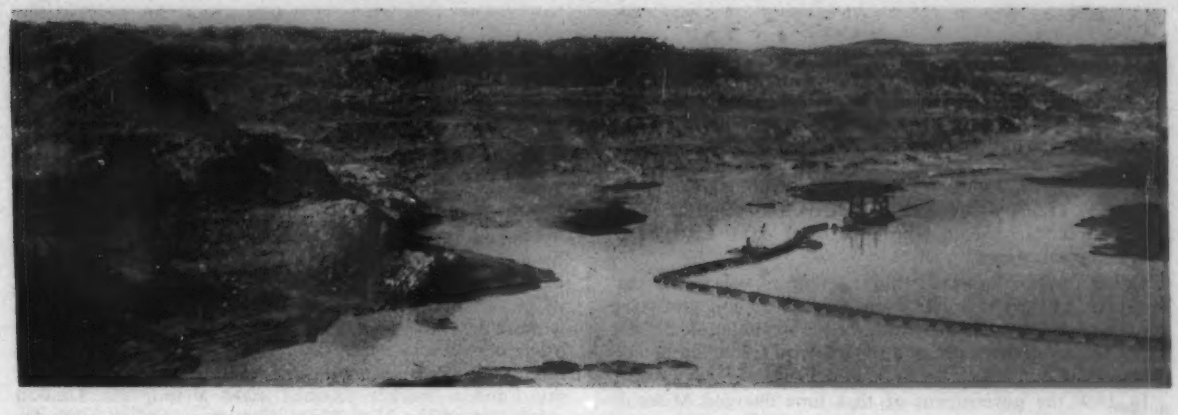
Friction-Type Hoists

Designs of the two systems, including the necessary headframe and other surface structures, were presented by the general engineering department. It was found that there was a considerable economic advantage in the friction-type system. A contract was then signed for the delivery of three friction-type hoists, each being independently counterweighted, and having automatic push-button controls and direct-current drives. The two skip hoists are each of 11 ft. dia. and are driven by two 1,250 h.p. shunt-wound D.C. motors. The cage hoist dia. is 100 in. and is driven by an 800 h.p. D.C. motor. All three hoists will be on the one floor with no deflection sheave being used. The hoists are to be mounted directly over the shaft opening.

The headgear is 60 ft. x 60 ft. and rises 108 ft. above the collar elevation. The shaft has eight compartments and is 17 ft. 2 in. by 24 ft. The shaft piping consists of a 16-in. pump discharge line, a 10-in. dia. air line, a 6 in. dia. water line, and a 4-in. dia. drain line.

Two level stations are to be cut initially—the first 940 ft. and the second 1,240 ft. below the surface. For many years production will come from the first level only, and the second level will be used for drainage. On the first level will be the main sump and pump room. The skips will be a bottom dump kind of conveyance. They will be loaded by loading pockets based on the same principle, wherein the bottom loading pocket is extended out into the shaft by an air cylinder.

At the Errington mine extremely modern mining equipment is being put to use, and time-study engineers are studying conditions. Two parallel headings are to be driven out from the station to the underground crusher, about 1,100 ft. from the shaft. One opening (10 ft. by 10 ft.) will act as a service exit for men and materials, the other (8ft. by 8 ft.) will be a conveyor-way carrying crushed material to the skip loading pockets.



One of the dredges working in a corner of the lake, where overburden was stripped by hydraulic methods. The amount of water removed can be seen from the denuded banks

Equipment designed to enable handling of ore material to be kept down to a minimum will be installed, and the mining operation will be by block-caving method. Ore will be carried from the scram drifts to the underground crushing station by means of main and secondary conveyors. It is known that considerable ground support will be necessary, and investigations are being made to find out the most economic and suitable spacing and weight per ft. to be used.

The water table must be lowered below the area to be worked before economic development within the orebody can be started. The second level, therefore, 300 ft. below the first level, will receive priority in initial development work.

A single heading will be taken out to the footwall contact, and then drifts will be driven in both directions along the strike of the ore.

A production of 500,000 tons is aimed at from the Hogarth underground in 1960, to keep up with current planning. This should be followed by a rapid build-up to 2,500,000 tons in 1961. The production objective is 30 tons per manshift.

Geological Mapping the Key to Mineral Wealth

THE basic importance of geological mapping to the assessment and exploitation of mineral wealth is stressed by the Geological Survey Department of Tanganyika in the introduction to its annual report for 1957.

Average progress in regional geological mapping, described as " the prime function of any geological survey ", was maintained last year in Tanganyika. Knowledge of mineral resources was increased, not only by the activities of the Department, but also by those of companies engaged in exploration.

The report points out, however, that when the present state of knowledge in Tanganyika, as represented by maps and descriptions of regional geology and of mineral-bearing areas, is compared with that of most other African countries, it is seen that this territory does not yet possess the minimum knowledge necessary as a basis for sufficiently advanced mineral assessment, development, and exploitation. Nor is the knowledge being acquired at a sufficient rate to enable exploitation of potential mineral wealth to keep pace with development in other directions. Minerals tend to go " out of fashion ", and if those in demand remain unexploited, they are likely to have diminishing value. Furthermore, so-called " new " metals come into prominence, and it is desirable to assess their occurrence and potential well in advance.

Exploration for mineral deposits is effective, efficient, and economic, in direct proportion to the degree of pre-existing knowledge of the geological setting and environment. It is emphasized that this factor becomes increasingly important with progressive elimination of deposits easily found by surface prospecting. Mining and prospecting organizations look to government geological surveys to provide the basic maps, and are more attracted to those countries where these are available. They are the first to recognize and agree that such general geological mapping as they must of necessity undertake themselves in the absence of government maps is in the nature of an expedient, done with only limited and specific objectives related to the mapping, which remains the function and prerogative of government geological surveys. It can almost be said that countries where this is recognized are those which emerge as minerally wealthy, while those which appear to be poor in minerals are the countries where these matters have been neglected.

On its own very credible hypothesis that the availability of basic maps is in itself a stimulant to mining and prospecting, the Department has cause for legitimate pride in the present tempo of exploration in Tanganyika, where companies currently engaged in large-scale mineral investigations include the Western Rift Exploration Co. Ltd. (formerly Anglo-American Prospecting Co. Ltd.), Williamson Diamonds Ltd., the Rhodes Syndicate, New Consolidated Goldfields, and the B.P.-Shell Development Co. Ltd.

The Department itself continues to be extremely active. During 1957, a total area equivalent to seven ½-deg. squares, approximating 6,300 sq. miles in area, was mapped by eight geologists. The report draws attention, however, to the immensity of the gap to be filled. Out of a total of 312 ½-deg. sheets, there is still remaining the equivalent of 275 sheets, or 250,000 sq. miles, to be mapped on this standard, which is the least on which detailed work can be based. The greater part of this remaining area is geologically and mineralogically virtually unknown except in a very general way.

Eire's New Copper Mine

ON Wednesday, October 15, Mr. Lemass, Eire's Minister for Industry and Commerce, formally opened St. Patrick's Copper Mines at Avoca, County Wicklow, some 45 miles from Dublin. A major enterprise even by Canadian standards, this mine is being prepared for an eventual production of 4,000 t.p.d. of a pyrite/copper ore.

Credit for this important mining venture belongs in the first place to the constructive and far-sighted policy of successive Irish Governments towards the exploitation of the country's mineral wealth, and secondly, to Canadian enterprise.

In 1949 the government of that time charged Mianrai Teoranta, the state-sponsored mining company, to investigate the potentialities of the Avoca district, where the existence of a once prosperous and extensive mining industry was indicated by the presence of over 100 abandoned shafts ranging in depth from a few score to 600 and 700 ft. By the end of 1954 it had been conclusively proved that in a single zone about half a mile long, out of over three miles of known mineralized ground, and within a depth of less than 1,000 ft., there were over 15,000,000 tons of ore containing copper and pyrites in payable quantities.

Recognizing that heavy capital expenditure was needed to resuscitate the declining mining industry, the government introduced new legislation in 1955, whereby any new mining operation is exempt from income tax at the full rate during its first four years and exempt from income tax as to 50 per cent for the next four years. To qualify for this relief the new mining operation must have been commenced within the five years ended April 5, 1961.

Having thus created a favourable financial climate, the government advertised the Avoca property on the world's mining markets. In December, 1955, the Mogul Mining Corporation of Toronto, Canada, assumed control, operating through its subsidiaries, Irish Copper Mines Ltd., Canada, and St. Patrick's Copper Mines Ltd., a private company registered in Dublin. The authorized and fully paid-up capital of the Irish company is £1,600,000, the shares being controlled by Irish Copper Mines Ltd.

Under a 20 years' lease between the Irish Government and St. Patrick's Copper Mines, with renewal options, the company has mineral rights at Avoca covering about 6,745 acres and surface rights totalling approximately 169 acres. The company also has prospecting rights over a concession area of nearly 40 sq. miles.

Development Programme

To date, some £3,600,000 has been spent on the development of the property, this sum including an investment of £1,800,000 by Irish Copper Mines and a loan of £1,300,000 by the State-owned Irish Assurance Co., guaranteed by the Irish Government. A temporary loan of £350,000 by the Bank of Ireland, also under government guarantee, has been redeemed.

In addition to the mill and concentrator, the company has erected fully equipped workshops, engineering offices, an analytical laboratory, a hostel for 40 men, and 12 staff houses. A research laboratory is being established. Direct employment is given to 500 workers. To provide for the export of the copper and pyrite concentrates the harbour installations at Arklow, situated approximately six miles from the mine, were improved in collaboration with the Irish Government and the Arklow Harbour Commissioners to accommodate ships of 1,000 tons.

Articles describing mining methods at St. Patrick's Mine and the treatment plant will appear in subsequent issues.

Despite the difficulties which the copper industry has been experiencing, the Canadian entrepreneurs have always had the utmost confidence in the potentialities of Avoca, which was brought to production according to schedule, without any slowing down or curtailment of the programme originally envisaged. By a happy coincidence the opening ceremony took place on a day when the price of copper on the London market touched £240 a ton, the London equivalent of the New York price on which all estimates were based when this Irish-Canadian venture was launched.

St. Patrick's Copper Mines will yield three times as much copper a year as the whole of Eire did in the past and in the next 15 years is expected to produce copper ore worth up to £2,500,000 a year. The first three years' supply of copper concentrate has already been sold at ruling market prices and the first shipment has left Arklow harbour. It is hoped to arrange for the sale of the pyrites concentrate.

The Opening Ceremony

Pressing a button, Mr. Lemass set in motion the largest and most modern mill of its kind in Western Europe. The mill and mine were then blessed by the Very Rev. P. Fahey, P.P., Avoca, who was assisted by the Very Rev. W. Lillis and the Rev. Denis O'Kane.

Mr. H. H. D. Forman, managing director of St. Patrick's Copper Mines Ltd., welcomed Mr. Lemass, whom he described as a particular supporter of mining development in Ireland.

With Mr. Lemass to see the realization of a project supported by all parties in the Dail were Mr. W. Norton and Mr. G. Sweetman, who were Ministers for Industry and Commerce and for Finance respectively during the period of office of the last Inter-Party Government, when the Canadian company came to Avoca in 1956.

Among the 46 Canadians and Americans who came from Toronto with Mr. S. A. Perry, president of St. Patrick's Copper Mines, were the chairman, Mr. C. P. McTague, Q.C.; Mr. Gilbert Labine, president of Gunnar Uranium Mines and vice-president of Irish Copper Mines; Mr. H. W. Knight, Jn., president of Consolidated Mogul Mines Ltd. and a director of St. Patrick's; Mr. G. D. Pattison, secretary-treasurer, Irish Copper Mines; Mr. D. R. Michener, Speaker of the Canadian House of Commons; Mr. J. W. Spooner, Ontario Minister of Mines; Mr. R. A. Bryce, president, Macassa Gold and Uranium Mines; Mr. J. V. Byrne, chairman, Yellowknife Gold Mines; and Mr. H. I. Young, president, American Zinc Co. of Illinois.

Also in the Canadian party were executives of other mining companies, members of the Toronto Stock Exchange, and newspaper and radio representatives.

The attendance at Avoca included Mr. Hilliard, Parliamentary Secretary to the Minister for Industry and Commerce; Mr. J. C. B. MacCarthy, Secretary to the Department; Dr. J. P. Beddy, chairman, Industrial Development Authority; Mr. Murrough V. O'Brien, director of the Geological Survey Office; the Canadian Ambassador, Mr. A. Rive; and the Canadian Trade Commissioner, Mr. A. Gilbert.

The ceremony at Avoca was followed in the evening by a dinner at the Shelbourne Hotel, Dublin.

MINING MISCELLANY

A report this week states that the South African shaft sinkers flown to England last year by the Roberts Construction Co. have again broken British shaft-sinking records. The team of 17, working at the new Parkside Colliery, sank 310 ft. of shaft during September and lined 300 ft. The team's previous record was 282 ft. The main contractors are Kinnear Moodie & Co.

★

It is hoped to establish an office of the Copper Development Association in Salisbury, Rhodesia. This was announced this week following a meeting of the trustees of the Association, under the chairmanship of Sir Ronald Prain, who is chairman of the Association in London. The decision to establish an office in Rhodesia was taken last year and a senior official of the London Development Association is now in Salisbury to discuss detailed arrangements.

★

Mount Washington Copper Ltd., reports that work done by Noranda Explorations Ltd., a Noranda Mines Ltd. subsidiary, has disclosed extensive mineralization including gold, silver, and copper values at its property 20 miles west of Courtenay on Vancouver Island. Noranda is increasing the scale of its operations and, in addition to proceeding further with detailed geophysical survey of the 100-claim Mt. Washington property, has started bulldozer stripping and diamond drilling. The agreement with Noranda gives Mt. Washington the right to 72½ per cent of the vendor's position in a 3,000,000 share company to be formed. Mt. Washington would have the right to acquire further shares in the new company on the basis of 30 per cent to Mt. Washington and 70 per cent to Noranda. In return, Mt. Washington would have to contribute 30 per cent of all money spent on development.

★

A team of six Japanese geologists and mining engineers headed by Mr. Kimio Uemura, consulting geologist of the Japanese Committee for Oversea Iron and Steelmaking Raw Materials, conducted a survey of Perak's mineral wealth from October 6 to 10. During their tour they visited the Geological Survey Department Headquarters at Ipoh, and iron ore mines in the State of Malaya. Before arriving in Perak they had visited the large iron ore mines in Trengganu and in Johore. Mr. Uemura stated at Ipoh that his mission was not to buy iron ore but to make scientific investigations regarding Malaya's ore potential for Japan's long-term use, including the quality of the ore reserves, the location of the mines and reserves, and available shipping facilities. He added that the findings would not be published in Malaya. Japan is Malaya's largest customer for iron ore. The mission predicted that about 2,200,000 tons will be required in 1958, slightly less than in 1957.

The West German Miners' Union has stated that 53 pits in the Ruhr area dropped a shift last week, the highest number yet since unsold coal began mounting at the pit heads a few months ago. The Union said that about 162,000 miners are affected and will lose about 3,800,000 marks in wages. Since the beginning of West Germany's coal crisis a total of 1,544,000 shifts have been missed, and 36,000,000 marks in wages have been lost. Unsold stocks of coal at West German pits amounted to about 10,800,000 tons, more than a month's normal production, on October 14.

★

Certificates of Production issued to tin miners of the Federation of Malaya for the last quarter of 1958 are valid from October 1 to December 14 only. A Government statement says that this course has been taken to permit any necessary adjustments to ensure that the Federation's permissible exports under the International Tin Agreement up to December 31 are filled. The fifth quota period will commence on January 1, 1959.

★

The Uis Tin Mining Co., of South West Africa, in liquidation, has been sold to Industrial Mineral Exploration, a subsidiary of the South African Iron and Steel Industrial Corporation (Iscor) for £75,000. Ventures of Canada, which is owed £135,000 by the company, will be paid in part.

★

Marlime Chrysotile Asbestos Co., a wholly-owned subsidiary of Marble Lime, has granted a 20-year concession from the Bechuanaland Protectorate Government for the exploration of manganese resources. The concession extends over the whole of the Bangwaketse territory, an area of about 9,000 sq. miles. Mining has been commenced and it is understood that results so far obtained have been satisfactory. Marlime has been established in the territory for a number of years and the granting of the concession is the result of systematic prospecting.

★

The French group, CIAVE, have offered to provide equipment and services to a total value of $42,000,000 (equivalent) for the development of the Rio Turbio coal mines in Argentina.

★

Boyles Brothers Drilling Co. are to take a 20 per cent interest in Hard Metals (Canada), recently established for the manufacture and distribution of tungsten carbide bits and other items used in Canadian mining. Hard Metals (Canada), to accelerate its entry into the Canadian field, has purchased two existing Canadian companies, Gardner Steel of Noranda, manufacturers of tungsten carbide bits and drill steel, and Canadian Rock Co., also of Noranda, rock-breaking contractors. Mr. P. J. Oppenheimer, chairman of the Diamond Trading Corporation, is director of Hard Metals (Canada).

PERSONAL

Mr. O. Getz has joined, and Mr. P. Morris has resigned from, the board of Bushtick Mines (1934).

★

Mr. F. F. Espie has resigned from the post of deputy managing director of Western Mining Corporation Ltd., and has been appointed vice-chairman of the same company. Mr. L. C. Brodie-Hall has been appointed general superintendent in charge of Western Australian operations to succeed Mr. Espie.

★

Mr. A. P. Gagnebin has been elected vice-president, and Mr. J. M. Weldon assistant vice-president, of the International Nickel Co. Inc., of Canada.

★

Mr. A. J. Sadler has been appointed production superintendent of both Northspan Uranium Mines Ltd., and Algom Uranium Mines Ltd., of the Rio Tinto Group in Canada. Mr. J. K. B. Booth, previously regional manager in western Canada for Rio Tinto Canadian Exploration Ltd., has been appointed exploration manager for that company.

★

Mr. Gordon Diamand has been appointed secretary and controller of Canadian British Aluminium Co. Ltd. Mr. H. L. Murray has been named assistant secretary.

★

The new address of Rio Tinto Public Relations is, Board of Trade Building, 11 Adelaide Street W., Eighth Floor, Toronto 1, Ontario, Canada.

CONTRACTS AND TENDERS

Burma

Surveying and drafting equipment. Project Implementation Order No. 82-29-103-9-80017 (Tender No. UBAR 1/47). Issuing authority and address to which bids should be sent, Union of Burma Applied Research Institute, Kanbe, Rangoon, Burma. Closing date, November 10, 1958. Ref. E.S.B. 24205/58/I.C.A. Telephone inquiries to Chancery 4411, extension 354.

Ceylon

Best selected grade locomotive coal, totalling 160,000 tons, during the period January 1, 1959, to December 31, 1959. Issuing authority, Ceylon Government Railways. Bids to the Chairman, Tender Board, Ministry of Transport and Works, Transworks House, P.O. Box 547, Colombo. Closing date, November 26, 1958. Ref. E.S.B. 23941/58. Telephone inquiries to Chancery 4411, extension 738 or 771.

Korea

Construction, Mining, and Conveying Equipment. Seven Deep-Well Jet Pumps with heavily galvanized steel tank. Capable of drawing water from 90 ft. wells. The motor to be ½ h.p. Project Implementation Order No. 89-13-432-9-70488. Issuing authority and address to which bids should be sent, Office of Supply, Government of the Republic of Korea, Seoul, Korea. Closing date, November 7, 1958. Ref. E.S.B. 25056/58/I.C.A. Telephone inquiries to Chancery 4411, extension 354.

Machinery and Equipment

A New Design of Belt Conveyor

A new design of ropebelt conveyor, reported to offer specific advantages over other types of conveyor structure, was introduced into the United States five years ago (it is reported that 90 per cent of the conveyor structure sold in the U.S. during 1957 was of the ropebelt type), and is now being produced and marketed under licence in this country by Distington Engineering Co. Ltd., a subsidiary of the United Steel Companies Ltd. Known as the Distington-Goodman resilient ropebelt conveyor, first deliveries of the structure have already been made to the North Eastern Division, National Coal Board. Although primarily designed for colliery use, the structure is readily adaptable to metal mines, opencast operations and quarries, as well as to several surface applications.

Principal difference between the ropebelt conveyor and the orthodox conveyor structure is the substitution of wire rope for rigid side frames. Chain-linked troughing idlers clamped at intervals between the parallel wire ropes provide a resilient support to the loaded belt and give a carrying capacity up to 20 per cent greater than that of conventional rigid-framed conveyors. Because of the troughing action of the idlers, spillage is almost eliminated and this flexible method of suspension also considerably reduces impact damage to the belt as it passes over the idlers, cutting down belt wear and giving longer idler life.

Weighing only one-third of conventional conveyor line material, the ropebelt conveyor can be assembled or dismantled in a fraction of the normal time as the main stands, at which the ropes are tensioned and anchored, are spaced from 150 to 300 ft. apart, depending on the material to be carried. With conventional structure, stands must be lined up correctly at 9 ft. intervals, whereas ropebelt structure is lined up at each anchor point. The equipment can be operated with any existing drive and tail pulley and can be linked to any other type of conveyor structure.

The main supporting stands of the ropebelt conveyor are of welded construction with two independently adjustable legs to allow for uneven floor surfaces. The anchor ropes are tensioned to about 1,000 lb. by heavy duty turnbuckles employing anchor brackets secured by floor bolts or lightweight props. The intermediate stands, usually spaced at about 20 ft. centres, are of similar but lighter construction to the main stands. Both stands carry 4 in. dia. return idlers, positioned to give a minimum clearance of 12 in. between the underside of the idler and the floor.

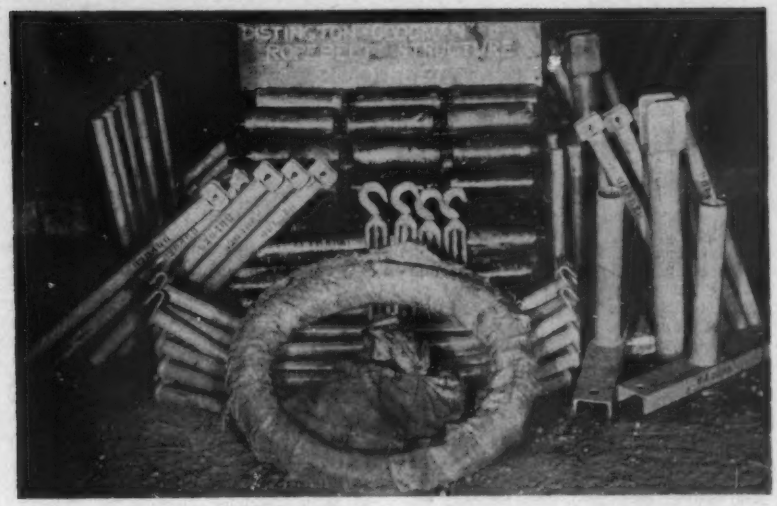
Above: The Distington-Goodman ropebelt conveyor installation in service at a colliery in the North-Eastern Division, National Coal Board. Below, at left: The conveyor structure showing the position of the troughing idlers under non-load carrying conditions. And at right: The troughing idlers under load. Note adequate clearance between the bottom idler and the decking

The longitudinal members of the structure consist of ¾ in. dia. steel wire ropes in tension, the spacing between the wires being maintained by spreader bars and intermediate stands; normally, one spreader is fitted between each pair of intermediate stands and is secured to the rope by steel wedges.

Three 4 in. dia. deadshaft rollers form the troughing idler assembly. Each roller is equipped with special prelubricated ¾ in. dia. precision ball bearings with renewable seals. The centre roller is joined to each of the wing rollers by a roller chain link pivoting about a longitudinal axis. The outer ends of the wing rollers are connected to wire rope clamps by a roller chain link pivoting about a vertical axis. The clamps hook on to the wire ropes and are securely located by steel wedges.

The method of roller connection imparts the unique "cupping" action to the idler assembly when subjected to load, while the rope spreaders, by keeping the ropes apart, control the downward deflection of the centre roller so that the angle of the wing rollers does not exceed 35 deg. 4,000,000 tons of coal have been carried over these idler assemblies in the United States without appreciable wear. In a typical application they are located at 5 ft. intervals but any changes in operating conditions or load can be met simply by altering this spacing.

The component units of the ropebelt conveyor can be supplied to accommodate belts up to 48 in. wide and, in some cases, the reduced wear associated with the troughing idlers permits a thinner ply belt to be used than would be possible with a conventional structure. Because of the open nature of the structure, maintenance problems are



simplified and there is no possibility of the framework obstructing the passage of the belt.

Of particular interest in respect to the Distington-Goodman unit is the compactness achieved when all components are packed for purposes of transportation, a prime factor when export and manoevrability are considered. Statistics show that 100 yds. of 30 in. ropebelt conveyor structure, minus belting and wire rope, are accommodated in a storage area of 8 ft. 6 in. by 3 ft. 8 in. The weight is 3,040 lb. Wire rope for the same length weighs 640 lb., this total comprising four lengths of 220 ft. each. Statistics relating to the belts used naturally vary according to type.

THE ROTAIR COMPRESSOR

Holman Brothers Ltd., announce that following their agreement with James Howden & Co. Ltd., a Portable Rotary Screw Compressor has been specially developed with definite built-in pressure ratio and axial flow characteristics. Known as the Rotair, it is a compact lightweight machine delivering compressed air free from pulsation. The compressor consists essentially of two helical fluted intermeshing rotors mounted in one casing. As they rotate, air is drawn through the inlet port to fill the interlobe space. The air is then trapped and compressed with a progressive reduction in the volume space until released into the discharge port of the compressor. The male rotor, which has four lobes, absorbs practically all the power required by the compressor. The female rotor, which has six lobes, functions as a rotary valve resulting in a continuous piston effect.

In this portable application high efficiency is achieved in a single stage by the use of oil cooling which results, without the aid of inter and after coolers, in air-delivered temperatures at least 100 deg. F. less than those obtained from conventional compressors.

The Holman Rotair Range, giving outputs of 135 to 600 c.f.m., will employ a variety of Diesel prime movers, including Cummings, Dorman, Ford, Leyland, Meadows, Rolls-Royce and Ruston. Amongst the representative range that will be on view on the Holman Stand at the Public Works Exhibition, is the Rotair 600, which, with its independent wheel springing, results in a machine of excellent manoeuvrability and compactness.

Increased rotational speeds have resulted in a high performance hitherto denied the slower speed reciprocating compressors. The vane type rotary compressor normally runs at direct engine speed but the Rotair is able to function at more than double the speed of the diesel engine, with the use of step-up gearing to give a maximum compressor speed of 4,000 r.p.m.

The illustration above shows one feature of the Distington-Goodman ropebelt structure, namely, the small amount of space it occupies in transit. Below : The two rotors of the Holman Rotair portable air compressor. The unit is viewed from the discharge side

Reciprocating and vane type machines are usually two-stage, in order to obtain the desired built-in compression ratio. The Rotair is claimed to obtain this rate easily in one stage.

The air flow through the Rotair compressor has axial flow charcteristics and only the delivery end of the machine is subjected to high pressure. The rotors are located by matched pairs of combined journal and thrust bearings at the delivery end and expansion is catered for at the opposite end by the use of standard roller bearings.

Friction is reduced to the absolute minimum. The rotors have positive clearances within the stator casing and the only friction is that between the engaging helices of the rotors. Since interlobe loading between the rotors is very light and also because of the existence of the cooling fluid, this rolling engagement results in only very small losses. The stator casing is therefore non-wearing, there being no metal to metal contacts.

The total number of moving parts in the basic compressor is only six, comprising two rotors and four bearings. With these few parts maintenance is negligible and the compound oil pump can be renewed as an independent unit, quickly and easily. Output of compressed air is controlled automatically according to demand by a simple mechanism which slows the engine down until the compressor is ultimately offloaded. This is brought about by controlling the inlet volume at the intake.

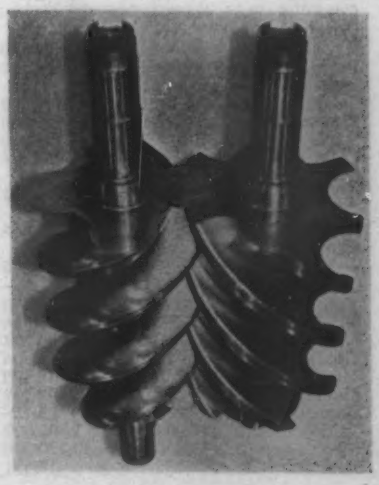
Oil injection effectively cools the air during the actual compression cycle. It is then recovered, cooled and returned to circulation, passing through a dual-purpose radiator which also cools the engine circulating water. The resulting air temperatures are less than 100 deg. F. above ambient and the oil loss is negligible.

MINING WITH RADIO

The Soviet All-Union Coal Research Institute has been working since 1949 on the problem of mining hard rocks such as granite and sandstone which are mined only with great difficulty. All thermal, chemical, and other non-mechanical methods which have been tried were unsuccessful, and because of this the investigation has concentrated on the application of short radio waves. (Blasting with explosives is, of course, an effective method but in many cases it cannot be applied.)

The latest development is a "transmitter" of extremely short waves (wavelength 10 cm. — frequency 3,000 megacycles per second — and radiated power 2½ kW.). The "transmitter" or, as it can rightly be called, "ray gun", weighs just over 20 lb., and is connected by a cable to a source of direct current supplied from a rectifier located either in the mine itself or on the surface. The radio waves are directed against the rock by a suitable wave guide.

This particular instrument has been designed for breaking up large ore or rock fragments, the breaking up occurring as a result of the stresses which are induced in the rock when the electromagnetic energy of the radio waves is changed into heat energy. The whole process takes approximately 20 secs. It is possible to adjust the radiation in such a way as to cause fracture on the surface of the rock or deep inside it. In the latter case the rock "explodes". Both this instrument and a larger one, which can be used for breaking up or direct mining (hewing), are already in serial production.



Metals and Minerals

Russia's Metal and Mineral Exports

Under the heading "The Joker in the Pack", we commented last week on a report on Russia's mineral trade prepared by members of the Division of Foreign Activities of the Bureau of Mines, U.S. Department of the Interior. In view of our absence of reliable and up-to-date statistical data regarding Russian mineral production and exports, we return to the Bureau of Mines report, from which the following information is derived. The report notes that from 1938 to 1956 the proportion of the U.S.S.R.'s mineral imports to the total value of foreign trade dropped from 29 to 26 per cent, while exports of mineral commodities have increased from 13 to 31 per cent.

While nearly all the pre-war imports consisted of metals and metal products, these commodities constituted less than one-third of Soviet mineral imports in 1956. Almost all the increase in the proportion of mineral exports is due to the growth in ferrous and non-ferrous metal exports.

About 70 per cent of the export trade in minerals and more than 80 per cent of imports are with the Communist nations.

Analysing some of the motives that may lie behind Soviet foreign mineral trade, the report points out that, as a result of the large exploration programme, the U.S.S.R. found new mineral resources, which it developed beyond its own normal domestic needs. The recent economic reorganization of the country resulted in a slowdown in the development rate of some mineral and metal industries, while others did not experience a commensurate slowdown of development pace and are out of step with the rest of the industrial development programme.

As a result of intensive geological prospecting and exploration, the U.S.S.R. claims possession of commercial reserves of all mineral commodities, including diamonds. It further claims the world's largest explored reserves of iron ore (41 per cent of world total), manganese ore (88 per cent), copper, lead, zinc, nickel, bauxite, tungsten, mercury, mica, potash salts (54 per cent of world total), titanium, molybdenum, uranium, sulphur, and numerous other minerals.

There are insufficient quantitative data on the individual commodities to support these Soviet claims. Some statements, however, are clearly inconsistent with widely accepted views; e.g., that Communist China has the world's greatest tungsten resources. However, the U.S.S.R., if for no other reason than its immense size, undoubtedly possesses great mineral wealth and, according to Soviet sources, proved reserves of most mineral raw materials are increasing faster than their exhaustion by expanding industry.

The report points out that, despite the great progress claimed, the mining and metallurgical industries of the U.S.S.R. are plagued with low labour productivity, raw material supply and distribution and transportation problems. Many Soviet ventures in the minerals and metal fields are economic failures if measured by Western standards.

Unfortunately, this observation, however justified, is scant consolation for Western producers faced with the appearance on world markets of growing quantities of Iron Curtain metals at cheap prices!

The accompanying tables, are extracted from the U.S. Bureau of Mines Mineral Trade Notes Supplement No. 55.

HIGHER SILVER PRICE

The domestic output of refined silver increased to 5,886,000 f.oz. from 4,621,000 oz. in July, reports the American Bureau of Metal Statistics. In August last year production was 5,058,000 oz. August refined bulion imports rose to 3,179,000 oz. from 1,819,000 oz. in July. As reported in our last issue, silver prices have been trending upwards in recent weeks. In New York the open market price is currently 90⅜ c. per oz.

London silver prices have gone further ahead, the rise being helped by a steady Continental inquiry and demand for essential industry. Rising in three stages, the spot price made a net gain last week of 1¼d. at 78½d. per oz. —its highest level since November 4 last year. The forward price advanced 1¼d. to 78¾d., its highest since August 6 last year. The current prices can be seen from the table on page 453.

RHODESIAN MICA

A company incorporated in Tanganyika, the New Africa Mica Co. Ltd., recently established offices in Salisbury, S. Rhodesia, and is reported to be offering free geological advice to existing and potential producers of mica. A subsidiary of the Otto Gerdau Co.—a U.S. concern with world-wide mica interests — New Africa Mica is setting up sorting and grading sheds and will employ between 40 and 50 workers. Mica delivered at the Salisbury warehouse is usually cut but is unsorted and ungraded. Upgrading of many consignments is said to be possible through skilled cutting. Contact has also been made with producers in N. Rhodesia and Portuguese East Africa.

RUSSIA - U.S. METAL OUTPUT, 1957

Material	*Tonnes* U.S.S.R.	U.S.A.
Coal ...	463,000,000	469,957,000
Petroleum, crude	98,300,000	360,000,000
Peat ...	54,100,000	349,000
Iron ore, marketable	84,200,000	107,852,000
Pig iron ...	37,000,000	73,612,000
Steel ...	51,000,000	102,253,000
Chromite ...	600,000	150,734
Manganese ore	4,960,000	332,331
Tungsten ore (60% WO_3)	7,500	7,656
Nickel, content of ores	50,000	8,680
Copper, smelter	410,000	1,060,790
Lead, smelter	290,000	483,956
Zinc, smelter	350,000	894,294
Tin, smelter	13,200	1,564
Bauxite ...	1,250,000	1,438,900
Aluminium ...	505,000	1,494,769
Magnesium	55,000	73,720
Gold ...	10,000,000	1,800,000
Silver ...	25,000,000	38,720,200
Platinum ...	125,000	18,531

SOVIET "BLOC" - FREE WORLD METAL EXPORTS - IMPORTS, 1956

Metals	*Exports (000 tonnes)* Communist Nations	Free World	Total	*Imports (000 tonnes)* Communist Nations	Free World	Total
Iron ore	9,124.4	—	9,124.4	—	—	—
Manganese ore ...	582	336	917.8	—	—	—
Manganese ore (peroxide)	11.3	1.4	14.0	—	—	—
Chromite ore ...	42	177	219.0	—	—	—
Zinc concentrate ...	30.0	—	33.1	110.6	—	110.6
Lead concentrate ...	—	—	—	17.0	—	17.0
Zinc ore	—	—	—	—	12.6	12.6
Lead ore	—	—	—	36.2	19.7	55.9
Alumina	—	—	—	20.0	—	20.0
Bauxite	—	—	—	—	305.7	305.7
Copper (includes wire)	39.9	—	52.4	0.3	—	0.3
Zinc	23.0	27.9	50.9	47.1	—	48.1
Lead	40.5	—	40.5	22.8	0.9	26.7
Tin	2.51	0.49	3.3	15.7	—	15.7
Aluminium	30.6	29.3	59.9	7.7	2.0	9.7
Cadmium	0.21	—	0.22	—	—	0.3
Cobalt	0.03	—	0.14	—	—	—
Magnesium	—	—	2.8	—	—	—
Antimony	0.1	1.65	1.8	7.0	—	7.0
Mercury	—	—	0.32	—	—	—

JOHNS-MANVILLE TAKES OVER ADVOCATE ASBESTOS

After weeks of negotiation, Advocate Mines has signed a financing agreement that provides for bringing its asbestos property in Newfoundland into production. The participants include Canadian Johns-Manville, the world's largest asbestos producer, Patino of Canada, and two companies—Amet Corporation Inc. and Financière Belge de l'Asbestos-Ciment S.A. — representing major European consumers.

Following an initial examination, involving a minimum expenditure of $1,000,000, the Johns-Manville group is to provide up to a further $17,900,000 to bring the property into production with a 3,000-ton mill. It is anticipated that two years will be spent in exploring and developing the mine and another 1½ years will be required to build the mill. Johns-Manville considers that, by the end of that period, world conditions should be such that all the Canadian asbestos production, including that of Newfoundland, will be absorbed. Johns-Manville will control management.

Advocate's concession covers approximately 1,500 sq. miles at Baie Verte on the Burlington Peninsula of Newfoundland's north coast. Currently indicated reserves are placed at 23,400,000 tons grading $10 per ton. Mining costs are calculated at $3.27 per ton. There are indications of other asbestos deposits and it is considered that the present tonnage estimates can be materially enlarged.

A notable feature of the deal is that the financing group guarantees to purchase 25,000 tons of asbestos annually —equivalent to about two-thirds of the proposed annual output — at market prices for a period of 10 years. It is further understood that they have undertaken to use their best efforts to market the additional production.

★

Coincident with the improvement in the building industry in the U.S., there has been a noticeable pick-up in shipments of asbestos fibre. In July these were running roughly 10 per cent ahead of the corresponding month last year. August and September figures have been broadly in keeping with this trend.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Following the sharp rise in prices over the last few weeks the markets now show a tendency to consolidate at levels slightly below the maxima so far reached. There is, however, no disposition on the part of any observer to look for substantially lower prices, as industrial news from the United States is still good whilst the news from the U.K. and Europe is a little more optimistic than has been the case recently.

IS 30 c. THE LIMIT?

The copper market has been the strongest of the four as strikes continue, and the latest statistics for August show stocks throughout the world diminishing fairly rapidly. The strike in Canada shows no signs of any settlement, but by Tuesday afternoon there were rumours of a possible settlement in Rhodesia. In America strikes still continue at the Chino Mine and also at the Phelps Dodge Refinery at El Paso. In Chile the rail strike has been settled and shipments of copper have now recommenced.

Statistics issued in New York by the Copper Institute covering the month of August show that in the States production rose by about 7,000 tons, whereas deliveries showed a greater increase of some 14,000 tons. Overall stocks of refined copper showed a decrease of about 37,000 tons at 178,494 tons. Outside the States production was down by about 22,000 tons with deliveries down about 8,000 tons, and stocks showing a decrease of about 23,000 tons at 197,793 tons.

The backwardation on the London market continues and varies from day to day owing to the technical position, but at the beginning of the week stocks in official warehouses showed a further drop of 631 tons to a total of 8,919 tons. It is, therefore, expected that the present pattern of the market will be continued for some time to come.

All the various factors have resulted in a definite upward price movement, and in America the customs smelters have raised their price to 30 c. per lb., whilst in Belgium the price has been increased three times during the last week to a figure which is approximately equivalent to 30.60 c. per lb. New York or Antwerp. U.S. primary producers have also again raised their price, this time 1½ c. to 29 c. There is, however, a strong body of opinion which feels that a serious attempt will be made to hold the price level at 30 c. per lb. in view of the possibility of substitution if the price rises further.

In Europe consumers are showing a little more interest in buying the metal, although this may be based more upon fears of shortage arising from the Rhodesian strike than from increases in orders. In America, demand appears to be growing, and there are signs that stocks are being replenished.

TIN STEADY

The tin market remains relatively steady with bouts of selling being fairly easily absorbed, and the general opinion is that the market will move to higher levels within a few weeks. The backwardation is maintained and stocks in official warehouses showed a very small decrease in the week at 17,609 tons.

The market in Singapore has been fairly active but has remained within a limited price range. Shipments from Singapore during the first half of October totalled 232 tons against 195 tons in the first half of September and 408 tons a year ago. Of this tonnage once again none was shipped to the U.K. Shipments from Penang totalled 1,254 tons compared with 1,083 tons in the first half of September and 1,476 tons last year; here again, no metal was shipped to the United Kingdom.

On Thursday morning the Eastern price was equivalent to £760½ per ton c.i.f. Europe.

QUOTAS BEGIN TO BE FELT

The lead and zinc markets have continued to maintain a firm undertone with demand for nearby metal predominating, and this has given rise to the re-establishment of a backwardation in lead as well as in zinc. Shipments still continue to be made to the United States against the existing quota for this quarter, but many people feel that a considerable tonnage will be shut out. It has, in fact, already been announced that the Belgian import quotas have been filled and some metal has had to be put into warehouse waiting for the beginning of the next period.

Recent figures show that the U.S. mine production of lead during August was some 10 per cent below that of July, whilst in the case of zinc, production remained almost stationary. However, the level this year is some 32 per cent below that in the corresponding period of last year. The St. Joseph Lead Co. have announced that they are recommencing working for five days a week on some of their properties and it is expected that other American mines will follow suit behind the protection of the tariff barrier and the quota system.

WHAT HOPE FOR GENEVA?

The world position in the lead and zinc markets will again be reviewed at a second meeting of the United Nations conference on the subject, which has been called to meet in Geneva on November 10 to 13, to be preceded by a meeting of the sub-committee which was appointed to consider the replies of the various governments to the questions put following the last meeting in London. It will be remembered that these referred to the possibility of world-wide export restrictions for a limited period, to be backed up by production cuts, and that a study group might be formed to consider the position of the world trade in the two metals. There is a feeling that the next meeting will find itself unable to agree on any methods for cutback in either exports or production and that the only result of the meeting is likely to be that a study group will be formed to consider the situation as it is and to examine possible future developments.

Closing prices are:

	Oct. 16 *Buyers*	*Sellers*	Oct. 23 *Buyers*	*Sellers*
COPPER				
Cash	£241½	£242½	£240	£241
Three months ..	£234	£234½	£233½	£233¾
Settlement ..	£242½		£241	
Week's turnover	12,850 tons		14,300 tons	
LEAD				
Current ½ month	£76⅜	£77	£76	£76⅛
Three months ..	£77⅛	£77⅜	£75⅝	£75⅞
Week's turnover	10,250 tons		9,600 tons	
TIN				
Cash	£744	£745	£743	£744
Three months ..	£735	£736	£738½	£739
Settlement ..	£745		£744	
Week's turnover	620 tons		845 tons	
ZINC				
Current ½ month	£72½	£72½	£72½	£72½
Three months ..	£71½	£71½	£71	£71⅛
Week's turnover	9,975 tons		8,575 tons	

London Metal and Ore Prices appear on page 453.

Mining Finance

Gold Fields Closes the Door

Consolidated Gold Fields has sprung something of a surprise. Despite lower profits it is raising the dividend from 4s. to 4s. 6d. for the year to last June with a final of 3s. 6d. Last year only the final was paid on the capital as increased by the July, 1957, new issue. The profit decline from £2,788,267 to £2,245,293 is caused mainly by the absence of the £698,000 profit on the Trinidad Oil deal in 1956-57 and partly by higher expenses largely owing to the new loan stock interest. Thus, dividends and interest rose by £119,910 to £2,252,128, profit on realization of investments fell by £483,229 to £669,923, while administrative expenses, including loan stock interest, were £179,655 up at £676,758.

The net profit after tax is £349,974 lower at £1,362,293, but investment and exploration reserve only gets £500,000 on this occasion against £930,000 previously so that, after allowing for the higher dividend of £789,540 net, the carry forward is only some £30,000 less at £339,213. It has been necessary to charge as much as £1,040,800 against the investment and exploration reserve for writing down investments compared with only £648,185 a year ago.

There is a possibility that Gold Fields Ordinary £1 shares will be sub-divided into 5s. shares. This is being considered in connection with a scheme that seems to be aimed at preventing control over the company ever being acquired via the Preference capital. There are 3,000,000 of the latter in issue of £1 each compared with 5,875,212 Ordinary. At present, voting rights are equal. This, the directors think, is inequitable in the light of the Ordinary's interest in the group's net assets—over £26,000,000—while that of the Preference is only £3,000,000. Thus, it is considered that effective voting control ought to be firmly established in the hands of the Ordinary shareholders.

Thus, certain changes in the voting rights of Preference holders are to be proposed in exchange for which the dividend on the first and second Preference is to be raised by 1 per cent to 7 per cent and a minimum repayment rate of 24s. per share established. What are the market effects of all this likely to be? Some advance in the price of the Preference should be one result, while the prospect of the Ordinary share split bringing the quotation for the £1 shares down from 58s. to 14s. 6d. for the 5s. shares may widen their appeal among investors.

The higher dividend is now seemingly covered only some one and a half times by earnings against not far short of three times for last year's payment, but there can be no direct comparison until the full report comes out on November 18 because the preliminary results only refer to the profits of the wholly-owned subsidiary, New Consolidated Gold Fields. The consolidated accounts for that concern and its own subsidiaries showed profits last year that were some 30 per cent higher than those for New Consolidated alone.

At 58s. cum the final dividend Gold Fields offer a yield on the latest payment of as much as 8 per cent. The board is evidently not alarmed about the effect on earnings of lower income from the group's base metal interests and the passing of the platinum dividends. Gold Fields' shares, in fact, look like going higher.

ZANDPAN—AT LAST

Details of the long-awaited Zandpan flotation are announced this morning. The mine, to the north of Vaal Reefs, has been granted a lease over 5,247 claims with the formula $y=15-\frac{90}{x}$

The issue consists of 5,200,000 shares of 10s. at par. Of these, 3,246,544 will be subscribed by Middle Wits, Anglo-Vaal, Anglo American, Federale Mynbou Beperk, Writs and General Mining. A further 1,940,955 will be offered by way of rights to holders of Middle Wits (1 for 10), Western Reefs (11 for 200), and Vaal Reefs (2 for 25), while the latter two mines are subscribing 12,501 shares firm. All these shares will carry the right in November, 1960, of taking up a further two shares at 12s. 6d. for every three held. When the proceeds of the issue are exhausted, three of the underwriting organizations will guarantee loan facilities of £2,000,000.

Initial plans are for a 7,500 ft. vertical shaft system and a limited amount of development. Further funds will be required later for a second shaft and the reduction plant.

AMALGAMATED TIN EARNS LESS

Lower profits for Amalgamated Tin Mines of Nigeria, the big tin and columbite producer, for the year to last March were inevitable, partly because of lower prices received and partly owing to reduced outputs. In the event the profit is down from £674,919 to £464,000 and the dividend is cut from 25 per cent on the 5s. shares to 14 per cent with a final of 6 per cent. The distribution requires £156,975 out of a net profit of £246,506. The company is fortunate in having the impact of O.T.C. tax savings to help matters along. Thus, £80,000 is transferred from the profit and loss account to contingencies reserve which also gets £50,000 from tax provided for and no longer required. This reserve now stands at £250,000 and the balance sheet maintains its usual strong position.

In view of the effects of output restriction under the International Tin Agreement and the poor market for columbite, the chairman, Mr. J. Ivan Spens, naturally has to give a warning that there

LONDON MARKET HIGHLIGHTS

South African gold shares opened the week firmly enough, but almost without warning a strong demand from the Cape, Germany and the U.S. sent share prices rushing up to new highs for the year. No very obvious reason emerged for the boomlet, but its effects were magnified by the fact that it caught many dealers short of stock. For this reason there was a certain amount of relief felt in some quarters when the advance "boiled-over" and prices gave up part of the earlier gains.

This shortage of stock played a large part in the advance of Welkom which on a sustained bout of buying reached a peak of 23s. 6d. before later reacting to 22s. 3d. Also strong were Free State Geduld — a further reflection of the September quarterly — with an advance to 5$\frac{5}{16}$. Quarterly influences were also at work in Buffelsfontein, up to 44s. 6d. on the record development values.

The star turn of the market, however, was provided by President Brand. Already firm, the shares strengthened to a high for the year of 60s. 3d. on news of the borehole in the central part of the property which gave values of up to 3,376 in. dwt.

Other particularly firm spots in a generally strong market were noted in S.A. Lands (25s. on steady investment buying) and Riebeeck (23s. 9d.) on the news that the merger with Loraine had received Court sanction. Even the rather uninspiring quarterly report from Free State Saaiplaas had no more than a momentary effect on the shares which soon shrugged off the disappointment of the fact that the Basal reef had not yet been reached from the No. 2 shaft.

Copper share prices were again willing to follow up the rise in the metal price. But there was a growing feeling of apprehension in the Rhodesian issues about the continued labour stoppage along the Copperbelt. Otherwise, such shares as Mangula (8s. 9d.), and Messina (110s.), were again buoyant. There was also a big turnover in Bancroft (24s. 3d.) as hopes of a resumption of mining operations grew. Elsewhere, a move to a high for the year of 21s. in Willoughby's gave rise to talk that the scrip issue forecast earlier this year must be drawing near.

The rise in Lead-zinc shares mentioned here last week gained fresh impetus. Again, it was difficult to see that the movement was soundly based. But while buying orders came in, dealers short of shares were forced to raise their prices. Then Broken Hill South issued a sobering announcement to the effect that as a result of lower metal prices and the curtailment of operations, 400 employees (nearly a third of the work force) were to be laid off. Broken Hill South quickly gave up 1s. 9d. of their recent advance at 48s. and Consolidated Zinc fell 1s. to 56s. 6d. Similar evidence of second thoughts was apparent in other Lead-zinc issues.

Feature of a quiet Tin group was the rise to 28s. in Ayer Hitam. This stemmed largely from the high output assessment of 1,858 tons a year for the new No. 2 dredge. It was pointed out, however, that the Tin Agreement quota for the dredge would be considerably less than this.

may be a serious decline in 1958-59 profits despite economies that are being effected. These included the taking over of all assets of the two subsidiaries, Keffi and London Nigerian. The former concern has already been put into liquidation. In the first six months of the current financial year, Amalgamated's permissible sales have been only 1,287 tons of concentrates compared with an output of 4,082 tons for the whole of last year. Moreover, the restriction screw is being still further tightened in the present quarter. On columbite, Mr. Spens says that demand has been disappointing, but there are hopes of a revival of interest in the uses of the columbite metal, niobium. Amalgamated produced 505 tons of columbite concentrates last year.

Amalgamated Tin shares stand at 5s. 9d. to yield over 12 per cent. The price is thus already standing at a level that is discounting some further cut in the dividend. This is the kind of stock that could recover sharply just as soon as there is the slightest sign that there may be some let-up in output restriction.

Extracts from Mr. Spens' statement are on page 454.

BRAND SETS THE PACE

On an evening that followed a day of strength in the O.F.S. gold share market, partly it was claimed as a result of buying from Germany and America, President Brand issued a borehole result that should cause shareholders in this Anglo American Corporation group mine to feel happier about the central section of their property than they may have hitherto have been. After an incomplete reef sample in the first core recovered from the hole a complete core was brought up from 7,240 ft. in a deflection. It assayed 173.15 dwt. gold over a width of 19.5 in., equivalent to 3,376 in. dwt., and 2.074 lb. uranium over the same width equal to 40.443 in. lb. In recent reef development Brand has been getting rather well under 20 in. lb. from uranium so the uranium value from the hole is also well above average.

The chief significance of this borehole, SP6, is its position. It was put down 2,650 ft. east of the central No. 2 shaft in order to obtain geological information as to the depth of the reef near the Ararat upthrow fault which pushes the Basal reef up to economic depth in the adjoining President Steyn property. The hole is rather more than halfway to the common boundary from the shaft and it has hit the reef on the Brand side of the fault. Its depth seems conformable with the normal dip of the reef and it is a fair conclusion that there is likely to be a rather longer unfaulted run on the dip from the No. 2 shaft than was hitherto thought probable. This is quite apart from the excellent values and the fact that the reef is wider than the 5 to 8 in. obtained from recent reef development at Brand.

The richness of the northern part of the mine, which has given the company its 17.7 dwt. ore reserves, is now well established. Values have so far been lower in the central area. It has, in fact, been the feeling that the mine may have seen its best grade in the early part of its career and would henceforth tend to sink in overall value that has taken a lot of the steam out of the value of the 5s. shares in the last two years. Now they are, at 60s., at a two-year high and shareholders have a nice profit on the new shares that they were offered at 45s. last June.

(*Continued on page* 456)

LONDON METAL AND ORE PRICES, OCT. 23, 1958

METAL PRICES

Aluminium, 99.5%, £180 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Crude (70%) £190 per ton
Ore (60%) bases 19s. 6d./20s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 9s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d. lb.
Cobalt, 16s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram.
Gold, 250s. 0d.
Iridium, £20/£22 oz. nom.
Lanthanum (98/99%) 15s. per gram.
Manganese Metal (96% - 98%) £290
Magnesium, 2s. 5¼d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £17/£18 oz. nom.
Osmiridium, nom.
Palladium, £5/£5 15s.
Platinum U.K. and Empire Refined £21 5s. oz.
Imported £18 15s./£19 15s.
Quicksilver, £78 0s. ex-warehouse
Rhodium, £40/42 oz.
Ruthenium, £14/£16 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 78¼d. f. oz. spot and 78¼d. f'd.
Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth			65% 8s. 6d. lb. c.i.f.
			18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—			
Rhodesian Metallurgical (semifriable) 48%	(Ratio 3:1)		£15 15s. 0d. per ton c.i.f.
,, Hard Lumpy 45%	(Ratio 3:1)		£15 10s. 0d. per ton c.i.f.
,, Refractory 40%			£11 0s. 0d. per ton c.i.f.
,, Smalls 44%	(Ratio 3:1)		£14 0s. 0d. per ton cli.f.
Baluchistan 48%	(Ratio 3:1)		£11 15s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade			nom.
Fluorspar—			
Acid Grade, Flotated Material			£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)			156s. 0d. ex works
Lithium Ore—			
Petalite min. 3½% Li_2O			40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O			40s. 0d./45s. 0d. per unit f.o.b. Beira
Ambigonite basis 7% Li_2O			£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined			£28 0s./£30 0s. d/d
Magnesite Raw (ground)			£21 0s./£23 0s. d/d
Manganese Ore Indian—			
Europe (46% - 48%) basis 55s. 0d. freight			83d./85d. per unit c.i.f. nom.
Manganese Ore (43% - 45%)			70d./75d. per unit c.i.f. nom.
Manganese Ore (38% - 40%)			50d./54d. per unit c.i.f. nom.
Molybdenite (85%) basis			8s. 5d. per lb. (f.o.b.)
Titanium Ore—			
Rutile 95/97% TiO_2 (prompt delivery)			£35/£36 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2			£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)			65s. 0d./70s. 0d. per unit c.i.f.
Vanadium—			
Fused oxide 95% V_2O_5			8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) (65 - 66% ZrO_2)			£14 0s. per ton c.i.f.

AMALGAMATED TIN MINES OF NIGERIA

CHAIRMAN'S STATEMENT

The nineteenth Annual General Meeting of the Amalgamated Tin Mines of Nigeria Limited will be held on Novem-14, 1958, at 55-61 Moorgate, London, E.C.2.

The following is the Statement by **Mr. J. Ivan Spens, O.B.E.,** the Chairman, which has been circulated with the Report and Accounts for the year ended March 31, 1958.

Before dealing with the results for the year, it is with deep regret that we have to record the death of Mr. Richmond Temple in March and, since the close of the year, the resignation of Mr. W. M. Warren for reasons of health. Both these gentlemen had great experience of our industry and the benefit of their advice will be missed.

Accounts

The profit for the year, before taxation, is £464,006 against £674,919 for the previous year. Sales of both tin concentrates and columbite were lower than in the previous year and there was also a reduction in the price received, the average price ruling for tin sales being £732 per ton metal against £775 last year.

Taxation takes £217,500 and the sum of £80,000 has been transferred to Contingencies Reserve. As a result of the Company qualifying as an Overseas Trade Corporation from October 1, 1957, the sum of £50,000 being part of the taxation provided in 1957, is no longer required and this amount has also been transferred to Contingencies Reserve, bringing this Reserve to £250,000.

The contributions to the Buffer Stock now stand at £350,146 and this is shown as a separate item on the Balance Sheet.

A final dividend of 6 per cent. is now recommended and, if approved, will absorb £67,275, leaving a balance of £9,531 which increases the carry forward to £297,901.

Export Control

Control of tin production was introduced on December 15, 1957, and the year under review contains the first quota period which ended on March 31, 1958. In this first quota period the group permissible sales were 723 tons concentrates. Permissible sales for the first six months of the current financial year, i.e., to September 30, 1958, were 1,287 tons concentrates.

I am sure shareholders appreciate that with the restriction in production and bearing in mind that there has been a reduction in the quota for the fourth control period to December 31, 1958, the profits for 1959 can be seriously affected. We have had to retrench in almost every way and the consequent reduction in both European staff and African labour has been a grievous matter. Economies are being effected wherever possible consistent with the restricted output and and maintenance of the plant and properties.

We have recently been able to hire on mutually satisfactory terms some of our earth-moving equipment to the contractors constructing a major extension of the Nigerian Railways. In this way some revenue will accrue from the contractors to whom we have hired the equipment.

I am glad to say that a number of our and other retrenched African mining employees have been taken on by the Contractors.

Columbite

Sales again showed a decline on the previous year. While demand has been disappointing, we are hopeful of a revival of interest in the uses of niobium.

Subsidiary Companies

The question of whether we could achieve all-round benefits by your Company acquiring the undertaking of its two subsidiary companies was discussed on my visit to Nigeria last year and arrangements have been concluded which we are sure will procure substantial operating and administration economies.

The quotas under the tin restriction scheme which applied to each company are now grouped under one head.

Labour

Labour relations were peaceful. The sensible acceptance of the inevitable retrenchment, due to restriction of production, was most commendable.

Welfare

I am pleased with the good work being done in this connection. Your Board and the Management in Nigeria continue to take the greatest interest in the welfare of all employees.

Progress during the year is recorded in the Technical Managers' Report.

General

During the year under review Mr. H. E. Wilson, who had been General Manager of A. O. Nigeria Limited since 1946 and Chairman since August, 1949, returned to the United Kingdom on retirement. More recently we learned, with deep regret, of his death and I take this opportunity to place on record our deep appreciation of his many years of excellent service.

Mr. J. L. Farrington (B.A.Sc., M.I.M.M.) has now taken his place as General Manager and Chairman with Mr. E. Whitfield as his Deputy.

On grounds of economy, photographs of the mine have been omitted from the Report and Accounts this year but we shall certainly reconsider the matter when times are more favourable as I know the photographs are of interest to many shareholders.

Staff

I would again thank the Management, the Staff, both European and African, and the African employees for their excellent support and co-operation in this difficult period in our history.

FROBISHER IN KENYA

An interim report from Frobisher Ltd., one of Canada's major international mining organizations, reveals that oil rights have been acquired over almost 80,000 sq. miles in Kenya and Somaliland, comprising the whole of one of the few unexplored sedimentary basins remaining in the world. The structure is favourable to the occurrence of oil, and detailed geological appraisal is at present in progress.

To improve the company's working capital position, holdings in British Newfoundland Corporation, Northern Mining Co., and New Calumet Mines, have been sold. All of these investments were of a long-term nature, and it is believed that the funds can be more profitably employed in projects holding the promise of a more immediate return.

Referring to the group's principal interests, the report reveals that United Keno Hills Mines, the Yukon silver-lead-zinc producer jointly controlled by Frobisher and Conwest, has attempted to meet the combined effect of falling metal prices and rising costs by stepping up output. In spite of this, however, it appears that profit for 1958 will be somewhat below the 40.5 c. earned in 1957. Nevertheless, the Elsa Mine appears to be opening up satisfactorily, and during the first six months of this year 11,960 tons of the total mill feed of almost 130,000 tons came from this source. The Elsa ore graded an average of 52.25 oz. silver per ton.

Elsewhere, Giant Yellowknife is making progress in combating the difficulties caused by a refractory ore. Alterations in the flow-sheet now being made should result in improved recovery coupled with an increase in the plant's rated capacity of about 25,000 tons monthly. During the nine months to March 31, Giant Yellowknife milled 221,969 tons at an average grade of 16.1 dwt. for an estimated net profit of $605,870.

At Kilembe Mines, notable progress has been made in reducing costs during the first half of the financial year, while construction of the 500-ton concentrator, to be used in treating the oxide ore reserves, is up to schedule and completion is expected early in 1959.

S.E. YEAR-BOOK (VOL. 2)

The 1958 edition of " Black Skinner ", the Stock Exchange Official Year-Book, has now been completed with the publication of Volume 2.

This volume contains details of stocks in the commercial and industrial section, while Volume 1 covers all other securities, including the mining and financial sections. Between them, the two volumes give particulars of about 12,000 securities, including many banking, financial, and issuing companies which have no quotation of their own.

Also available now is the 1958 " Register of Defunct and Other Companies ". Details are given of more than 22,000 companies now liquidated or otherwise defunct, making the Register indispensable in dealing with deceased estates.

The Stock Exchange Official Year-Book and the Register of Defunct Companies are both obtainable from Thomas Skinner and Co. (Publishers) Ltd., Gresham House, Old Broad Street, E.C.2. The Year-Book costs £8 5s. for the two volumes and the Register £1 10s., both prices including postage.

Financial News and Results

Mattagami Claims for Rio Tinto.—Rio Tinto Canadian Exploration have acquired from Monpre Mining a working option over 48 claims in the Mattagami area.

Renong Tin Dredging.—Profit before tax of Renong Tin Dredging in the year to June 30 last was £53,396, against £58,204 in the previous year. Taxation took £24,000, leaving £29,396, of which £17,500 is to be used to pay the recommended final dividend of 6d. (last year 9d.). Meeting, December 11.

Northspan at Capacity.—The mills of Northspan Uranium are now running at their rated capacity, the company announces. To meet capital expenses and provide working capital, Northspan has deferred certain loan repayments and arranged an advance of $2,500,000 for one year from Rio Tinto Mining of Canada.

Marsman Investments.—Net income in the year to April 30, 1958, of Marsman Investments parent company of the Marsman mining interests in the Philippines, was £3,032. Expenses totalled £21,272, leaving a loss on the year's operations of £18,190 against £5,670 in 1957. Investment adjustments, which last year converted the loss into a £34,504 profit, added a further deficit of £39,094, making the total loss for the year £57,284. The debit balance carried forward now amounts to £191,556. The subsidiary, Marsman and Co., earned a profit of P899,895 against P718,435, reducing that company's accumulated deficit to P237,428.

Metal and Mineral Trades

Published by The Mining Journal Ltd., 15 Wilson Street, Moorgate, London, E.C.2, and printed by Washburn & Sons Ltd., Queens Road, Southend-on-Sea, Essex. Registered as a Newspaper.